

Amendments to the Claims

This listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims

1. (Currently amended) A method of determining the concentration or a relative concentration of an analyte in a multiplicity of samples of different origins using an instrument which separates and classifies microparticles and measures the results of a bimolecular reaction between an analyte and a reagent, comprising the steps of:

- (a) providing a population of microparticles which includes distinct subpopulations of microparticles, wherein each of the microparticles of the population comprises a polymeric microparticle and a plurality of nanoparticles coupled to the polymeric microparticle, wherein each of the distinct subpopulations of which is uniquely labeled with two or more labels having two or more characteristics detectable by the instrument, wherein substantially all of the microparticles of the population subpopulations having are attached to each microparticle the a reagent which reacts with the analyte in the bimolecular reaction, and wherein the results of the bimolecular reaction are measurable by the instrument;
- (b) exposing each sample of the multiplicity of samples to one subpopulation of the distinct subpopulations of microparticles to form a plurality of mixtures;
- (c) adding additional reagents to the mixture to facilitate a bimolecular reaction;
- (d) incubating the mixture plurality of mixtures until the bimolecular reaction is substantially complete;
- (e) combining the reacted samples plurality of mixtures to form a combined mixture;
- (f) passing the combined samples mixture through the instrument;
- (g) identifying the subpopulation of said each microparticle of the microparticles using the two or more characteristics of each respective subpopulation;
- (h) measuring the result results of the reagent and analyte bimolecular reaction of said each of the microparticle microparticles; and
- (i) calculating the concentration or relative concentration of the analyte in each sample of the multiplicity of samples.

2. (Currently amended) A method of determining the a concentration or a relative concentration of a multiplicity of analytes in a sample of a single origin using an instrument which separates and classifies microparticles and measures the results of a bimolecular reaction between an analyte and a reagent, comprising the steps of:

- (a) providing a population of microparticles which includes subpopulations of microparticles, wherein each of the microparticles of the population comprises a polymeric microparticle and a plurality of nanoparticles coupled to the polymeric microparticle, wherein each of the subpopulations of which is uniquely labeled with two or more labels having two or more characteristics detectable by the instrument, wherein substantially all of the microparticles of said each of the subpopulations having are attached to the reagent which reacts with one of the multiplicity of analytes with the a bimolecular reaction, and wherein the results of the bimolecular reaction between the reagent and the one analyte of the multiplicity of analytes being are measured in the instrument;
- (b) mixing an aliquot of the sample with said each of the subpopulation subpopulations of microparticles to form a plurality of mixtures;
- (c) —— adding additional reagents to the mixture to facilitate a bimolecular reaction between an analyte and a reagent;
- (d) incubating the mixtures until the bimolecular reactions are substantially complete;
- (e) combining the reacted samples plurality of the mixtures to form a combined mixture;
- (f) passing the combined samples mixing through the instrument;
- (g) identifying the subpopulation of said each microparticle of the microparticles using the two or more characteristics of the subpopulation;
- (h) determining the results of the reaction between reagent and analyte on said each of the microparticles by measuring the result results of the reagent and analyte bimolecular reaction; and
- (i) calculating the concentration or relative concentration of analyte the multiplicity of the analytes in each the sample.

3. (New) The method of claim 1, wherein said each of the microparticles further comprises magnet or magnetically responsive metal oxides selected from the group consisting of superparamagnetic, paramagnetic, and ferromagnetic metal oxide.

4. (New) The method of claim 1, wherein at least one of the two or more characteristics comprises a magnetic property.

5. (New) The method of claim 1, wherein the plurality of nanoparticles comprises nanoparticles of one or more nanoparticle populations.

6. (New) The method of claim 1, wherein the plurality of nanoparticles comprises nanoparticles of at least two nanoparticle populations, and wherein the at least two nanoparticle populations have different dye concentrations.

7. (New) The method of claim 1, wherein said each of the microparticles of one of the distinct subpopulations comprises a number of the plurality of nanoparticles that is different than a number of the plurality of nanoparticles included in said each of the microparticles of another of the distinct subpopulations.

8. (New) The method of claim 1, wherein the plurality of nanoparticles comprises two populations of the nanoparticles, and wherein said each of the microparticles of one of the distinct subpopulations comprises a ratio of the two populations of the nanoparticles that is different than a ratio of the two populations of nanoparticles included in said each of the microparticles of another of the distinct subpopulations.

9. (New) The method of claim 1, wherein the polymeric microparticle is stained with a dye.

10. (New) The method of claim 1, wherein said each of the microparticles is surrounded by a polymeric shell.

11. (New) The method of claim 1, wherein the instrument comprises a flow cytometer.

12. (New) The method of claim 2, wherein said each of the microparticles further comprises magnet or magnetically responsive metal oxides selected from the group consisting of superparamagnetic, paramagnetic, and ferromagnetic metal oxide.

13. (New) The method of claim 2, wherein at least one of the two or more characteristics comprises a magnetic property.

14. (New) The method of claim 2, wherein the plurality of nanoparticles comprises nanoparticles of one or more nanoparticle populations.

15. (New) The method of claim 2, wherein the plurality of nanoparticles comprises nanoparticles of at least two nanoparticle populations, and wherein the at least two nanoparticle populations have different dye concentrations.

16. (New) The method of claim 2, wherein said each of the microparticles of one of the subpopulations comprises a number of the plurality of nanoparticles that is different than a number of the plurality of nanoparticles included in said each of the microparticles of another of the subpopulations.

17. (New) The method of claim 2, wherein the plurality of nanoparticles comprises nanoparticles of two populations of the nanoparticles, and wherein said each of the microparticles of one of the subpopulations comprises a ratio of the two populations of the nanoparticles that is different than a ratio of the two populations of nanoparticles included in said each of the microparticles of another of the subpopulations.

18. (New) The method of claim 2, wherein the polymeric microparticle is stained with a dye.

19. (New) The method of claim 2, wherein said each of the microparticles is surrounded by a polymeric shell.

20. (New) The method of claim 2, wherein the instrument comprises a flow cytometer.